

Quadratic Equations

Chapter 2: Quadratic Equations · Topic 1

Key Concept

The quadratic formula, $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$, solves any quadratic equation, especially useful when factorisation is difficult.

The discriminant ($b^2 - 4ac$) determines the nature of roots - positive gives two real roots, zero gives one repeated root, negative gives no real roots.

Factorisation method solves equations by expressing them as a product of two linear factors set to zero.

Quadratic equations model real-life problems involving area, projectile motion, speed, and various optimisation scenarios.

Quick Revision Notes

- Quadratic formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.
- Discriminant = $b^2 - 4ac$.
- Positive discriminant: two real roots.
- Zero discriminant: one repeated root.
- Negative discriminant: no real roots.
- Factorisation: two linear factors set to zero.
- Quadratics model area, motion, speed problems.
- Practice builds equation-solving skills.

Practice Questions

- 1 Solve $x^2 - 7x + 12 = 0$ using factorisation.
- 2 Solve $2x^2 + 5x - 3 = 0$ using the quadratic formula.
- 3 Calculate the discriminant for $x^2 + 6x + 9 = 0$.
- 4 Discuss what the discriminant tells us.
- 5 Solve a real-life problem using a quadratic equation.
- 6 Explain the quadratic formula in your own words.